REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 5, 7-13, 15-21, and 23 are pending in the present application, Claims 1, 7, 8, 15, 16, and 23 having been amended. Support for the amendments to Claims 1, 7, 8, 15, 16, and 23 is found, for example, page 1, lines 14-15 and page 7, line 8 of the originally filed specification. Applicants respectfully submit that no new matter is added.

In the Office Action, Claims 1, 5, 7-9, 11, 15-17, 19 and 23 were rejected under 35 U.S.C. § 102(b) as anticipated by Beshty et al. (U.S. Patent No. 4,670,359, hereinafter Beshty); Claims 12-13 and 20-21 were rejected under 35 U.S.C. § 103(a) as unpatentable over Beshty in view of Von Andrian (U.S. Patent No. 6,977,118); and Claims 10 and 18 were rejected under 35 U.S.C. § 103(a) over Beshty in view of Tsukui et al. (U.S. Patent No. 4,629,664, hereinafter Tsukui).

With respect to the rejection of independent Claims 1, 8, and 16 as anticipated by Beshty, Applicants respectfully submit that the amendment to Claims 1, 8, and 16 overcomes this ground of rejection. Amended Claims 1, 8, and 16 recite, *inter alia*, "a direct organic liquid feed fuel cell." Beshty does not disclose or suggest a direct organic liquid feed fuel cell.

The "direct organic liquid feed fuel cell" commonly recited in amended Claims 1, 8 and 16 is distinguishable from a so-called "indirect" or "reformer" fuel cell. The "indirect" or "reformer" fuel cell requires a reforming process to extract hydrogen, as explained in the Description of the Related Art section of the originally filed specification. Differences between an "indirect" or "reformer" fuel cell and the claimed "direct organic liquid feed fuel cell" can be found not only in things attached to the fuel cell, such as the required reformer, but also in the fuel cell stack itself. These situations are well-known to persons skilled in the

art as evidenced by the disclosure of U.S. Patent No. 6,303,244, lines 42-54 of column 1, for example, which has been cited in a prior Office Action.

Beshty describes the "indirect" or "reformer" fuel cell because Beshty discloses that water and methanol, as sources of the fuel, are mixed with each other,[1] that the water/methanol mixture is supplied to reformer 23 and made to contact a catalyst so as to produce hydrogen,[2] and that the produced hydrogen is directed to anode compartment 32 of fuel cell 33.[3]

Therefore, Claims 1, 8 and 16, which each recite a "direct organic liquid feed fuel cell," are not anticipated by the disclosure of a "indirect" or "reformer" fuel cell in Beshty.

In view of the above-noted distinctions, Applicants respectfully submit that Claims 1, 8, and 16 (and any claims dependent thereon) patentably distinguish over Beshty.

Furthermore, Applicants respectfully submit that Von Andrian and Tsukui do not cure the deficiencies in Beshty. Independent Claims 1, 8, and 16 also recite a "heat exchanger," which the Office Action equates to the heat exchanger in Beshty. It is respectfully submitted that the heat exchangers taught by Beshty cannot be combined with a direct feed fuel cell system taught by Von Andrian and/or Tsukui to reach the invention defined by the independent claims without a substantial modification to Beshty that would require a change in a principle of operation of Beshty. Any proposed modification that would change the basic operating principle of a reference is not an obvious one. See In re Ratti, 123 USPQ 349, 352 (CCPA 1959).

As to the heat exchanger 31 in Fig. 2, which is refereed to in the outstanding Office Action, further modification is required for the following reason. In Beshty, a product gas stream, at a temperature in a range of about 135 degrees F to about 150 degrees F, from

[1] Beshty, col. 5, lines 56-63.
[2] Beshty, col. 6, lines 7-10.
[3] Beshty, col. 6, lines 34-35.

reformer 23 is directed to the heat exchanger 31.[4] At heat exchanger 31, the product gas stream is subjected to heat exchange with heat transfer fluid at 340 degrees F from the anode.[5] In contrast, Claim 1 recites "a heat exchanger exchanging heat between the liquid fuel ... and an exhaust exhausted from the direct organic liquid feed fuel cell," and Claims 8 and 16 commonly recite that a heat exchanger "exchanges heat between ambient air and the liquid mixture in the mixing container." Therefore, to reach the inventions of Claims 1, 8, and 16, further modification in which the opposite working fluid of the heat exchanger of Beshty is changed from the heat transfer fluid into the exhaust or the ambient air is required. The record does not provide any motivation or apparent reason to make this modification.

As to heat exchanger 26 of Beshty, a change in the principle of operation of heat exchanger 26 is required to reach the subject matter of Claims 1, 8, and 16. First of all, Beshty describes a hydrogen-air type fuel cell, in which production of hydrogen from methanol by steam reforming of methanol carried out in a reformer are necessary to generate electricity as discussed above. Both Von Andrian and Tsukui describe direct feed fuel cells in which fuel is directly fed to an anode.[6] This difference necessitates a change in the principle of operation of Beshty, if Beshty is to be combined with Von Andrian and/or Tsukui.

The reaction of hydrogen production (see the foot of column 4 through the top of column 5 of Beshty) occurring in the reformer is endothermic.[7] In order to accommodate the endothermicity,[8] the methanol/water mixture at about 350 degrees F must be superheated up to 900 degrees F prior to entering into the reformer.[9] For the purpose of this heating, the

[4] Beshty, col. 6, lines 19-39.
[5] Beshty, col. 7, lines 18-27 in column 7.
[6] Von Andrian,col. 2, line 63.
[7] Beshty, col. 1, lines 40-43.
[8] Beshty, col. 4 lines 53-55.
[9] Beshty, col. 6, lines 3-7.

exhaust from the anode at a temperature of 350 degrees F to 400 degrees F[10] is burned in the burner 47 and then subjected to heat exchange at the heat exchanger 26. If the methanol/water mixture is not superheated, the methanol/water mixture and the exhaust will have no difference in temperature (i.e., both with be about 350 degrees F). There will be no exchange of heat if there is no difference in temperature.

To modify Beshty to include a direct feed fuel cell taught by Von Andrian and/or Tsukui, Beshty must be modified to omit a reformer in order to directly feed the fuel to the anode. Then the heat exchange must not occur as discussed above and described in Beshty. Thus, change in the principle of operation of Beshty is required if Beshty is to be combined with Von Andrian and/or Tsukui.

Furthermore, it is to be understood that the above-noted arguments apply to other heat exchangers in Beshty.

Thus, Claims 1, 8, and 16 (and any claims dependent thereon), patentably distinguish over Beshty, Von Andrian, and Tsukui, taken alone or in proper combination.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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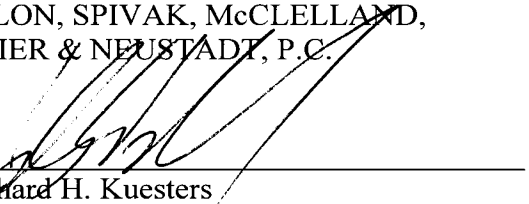

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[10] Beshty, col. 6, lines 58-63.